

Employing a Modular and Scalable Design for Next Generation Healthcare Respiratory Protection

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Abstract: At the conclusion of Phase 1, the Project BREATHE Interagency Working Group published a summary of twenty-eight recommendations for performance and functionality of a next generation healthcare respiratory protection solution that would address gaps in comfort, tolerability and functionality that inhibit user acceptance in the workplace today. With these recommendations in mind, hybridized B95 respirator concepts were developed that are modular and scalable, bridging gaps between the inherent advantages and disadvantages of filtering facepiece respirators (FFRs) and elastomeric half masks with respect to microclimate, airflow and moisture management, carbon dioxide buildup, protection factors, voice intelligibility, comfort and user burden. The concepts incorporate novel harness and doffing features to prevent self-contamination by fomite transmission, innovative sealing geometries and adaptable elements for anthropometric accommodation of a diverse worker population, features to improve voice intelligibility and an embodiment that optimizes airflow management for comfort and tolerability. The modular and scalable designs allow for safe use and disposal of B95 respirators during triage or movement from patient to patient in normal use scenarios; yet can easily be converted to a reusable B95 respirator to allow for extended duration use. The hybrid B95 respirator promotes appropriate use and acceptance by minimizing user physiological burden, minimizing training burden in transition from normal use scenarios to pandemic influenza use scenarios and minimizing the risk of interference with patient care and communication.